TECNOPOWER
MOTOR
WWW.TECNOPOWER-MOTOR.COM
Instruction Manual
"just better"
#P001M001

First of all we would like to thank you for choosing TecnoPower. The "Just Better" nitro powered engine you have purchased has been designed, developed and manufactured by former World Champion Rody Roem.

To get the best from your engine it is advised to read these instructions with great care and attention! These instructions include tips and tricks experienced by Rody Roem himself while racing, if you still have questions about this manual then please do not hesitate to ask for more precisions. We will be happy to try and help you further.

These instructions describe:

1. **Safety**
2. **Parts and equipment related to the operation of a nitro engine**
3. **Installation**
4. **Running-in procedure**
5. **How to start your engine**
6. **Carburetor settings**
7. **Maintenance**
8. **Warranty**
9. **DO! and DO NOT!**
10. **Notes**

Together with your engine you will find:
1 Page (A4 supplied with the engine instructions described below.
-Exploded view on one side.
-Tech information on the other with supplementary engine data, factory needle settings, engine dimensions.

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Safety

These nitro powered engines require a great deal of care and caution when working with them, during and around their operation. Please pay attention to these safety precautions:

- The fuel needed for these engines is highly toxic, avoid skin and eye contact and do not swallow it, also store it in a safe place well out of reach of children.
- Fuel is highly flammable; avoid exposing fuel to open flames or sparks.
- Exhaust gases are hazardous. Avoid inhalation or eye contact.
- The engine cooling head, manifold and exhaust pipe may reach temperatures over 100°C(212F), so always wear gloves when working on a hot engine.
- Avoid contact with the moving or rotating parts of the engine while the engine is running.

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Parts and equipment related to the operation of a nitro engine

This section describes the parts, and equipment that you will be using when you operate a model engine. This includes fuel, air-filter, carburetor, glowplug, exhaust system, and starting equipment.

FUEL

Only use commercially available fuel formulated for model car engines. Concerning what brand of fuel to use for our engines, we suggest that you follow the recommendation of your dealer from whom you have purchased your engine. The TecnoPower engines can be used originally with a fuel-mixture of 25% nitro maximum. If you want to use a higher content nitro

fuel, then it is advised to de-compress the engine by adding an extra head-shim of 0.1mm, this shim needs to be added in between the combustion chamber and the cylinder. Before using the fuel, shake the fuel bottle thoroughly to blend the oil and nitro with the methanol. Do not leave the fuel bottle open for long periods, as methanol quickly absorbs humidity from the air. This can deteriorate the quality of the fuel and increase the potential of corrosion forming inside the engine! We suggest not using fuel that has been unused for 6 months or longer and also we strongly advise not leaving unused fuel inside the engine when you are finished using it.

Note: Although high nitro % fuels may increase the power of your engine, it can however decrease the life of your engine depending on how hard you run your engine.

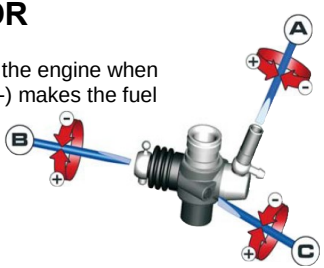
AIR FILTER

A properly maintained air filter is essential to the life and performance of every nitro engine. **NEVER** run your engine without an air filter!, even for a short period of time. Without an air filter, dirt will enter inside the engine and irreversibly damage and shorten its life cycle. Do not forget to impregnate the foam of the filter completely with the special oil that normally is supplied with the filter. Make sure that the foam of the air filter is completely oiled and in perfect shape at all times. Change the foam on regular basis and **do not** clean and re-use the foam.

CARBURETOR

A) MAIN NEEDLE

The main needle controls the amount of fuel going into the engine when the throttle is fully open. Turning this needle clockwise(-) makes the fuel mixture leaner, and turning it counter-clockwise(+) makes the fuel mixture richer.



B) IDLE NEEDLE

The idle needle controls the amount of fuel going into the engine when the throttle is fully closed. Turning this needle clockwise(-) makes the fuel mixture leaner, and turning it counter clockwise(+) makes the fuel mixture richer.

C) IDLE/AIR SCREW

The idle/air screw adjusts the opening gap when the throttle is in the closed position and determines the idle rpm. Turning this screw clockwise(+) makes the idle rpm higher, and turning it counter-clockwise(-) makes the idle rpm lower.

Attention : When you adjust the carburetor settings, make adjustments in very small increments, since the engine is very responsive for small changes in mixture settings.

GLOWPLUG

We advice to use only genuine TecnoPower glowplugs, since these have been extensively tested and approved for the maximum performance of our engines.
When attending to competitions and you want to monitor the engine, we suggest to regularly check the condition of the glowplug by taking it out of the engine and checking the condition of the wire!
The wire of the glowplug is exposed to high temperatures and will consume itself more or less fast depending on the carburetor setting. If you run your engine very hard and lean then the glowplug wire will consume itself much faster then when you use the engine at 90% of its possibilities, however even then you need to check and change the glowplug on regular bases.

How to check or monitor the glowplug.

- The spiral of the wire should glow a bright orange-white when connecting the glowplug driver. If the glowplug wire does not glow, first check the battery of the glowplug driver by testing with a new glowplug. If the glowplug driver cannot make the wire glow brightly, then replace or recharge the battery.
- When the glowplug wire is broken, melted or missing, this is in general not a good sign, and so it is advised to check your engine entirely for damage before you continue using it. A broken glowplug wire or the complete disappearance of the

wire is usually caused by running the engine too lean, so we suggest that you richen the main-needle setting after you have experienced a glowplug failure, and suggest that you avoid this if you want your engine to last.

EXHAUST SYSTEM

The exhaust system consists of a manifold and a pipe. The exhaust system has two functions, to optimize the engine performance and also to lower the noise level. The noise level is determined by the number of chambers used in the pipe, while the performance characteristics are determined by the shape and length of the pipe and manifold combination.
In general shortening the length of the exhaust system will improve top-speed performance at the expense of bottom-end torque, while lengthening the exhaust system will improve bottom-end torque at the expense of top-speed performance. However, shortening or lengthening the exhaust system beyond a certain point can dramatically decrease performance.

When using an IN-LINE exhaust system, there is no real need to worry about the right length as this is pre-determined, however it is very important to install the pipe and manifold assembly so there is no stress or tension in the alignment! While using an IN-LINE exhaust system, it is strongly suggested to regularly check the gaskets and replace when necessary.

Note : If you have a deteriorated exhaust gasket then it can happen one of the gaskets starts to leak and you loose the pressure inside the pipe with the result also less pressure towards the fuel-tank which will result in a leaner running of the engine without you noticing this!

STARTING EQUIPMENT

To be able to start your engine you will need:

- A starter box unless your engine is configured with a pull starter.
- A 1.5V glowplug driver is required to power the glow-wire for starting.
- A full fueltank.
- Some patience and determination sometimes...:-)

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Installation

MOUNTING THE ENGINE IN THE CAR

Before mounting the engine onto the chassis, it is important to first check that the engine is seated without any tension onto the engine mounts and is not touching the chassis! It is important to avoid any distortion of the crankcase!
Tip: Use a piece of paper between the pinion and the gear when tightening the engine mounting screws and after remove the paper. This should give you the right distance in the gear mesh.

When the engine is mounted in the car you have to connect the fuel and pressure lines and hook up the throttle linkage to the carburetor. Check the linkage so that the carburetor opens and closes smoothly without binding, also check if the carburetor opens and closes completely

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Running-in procedure

Please read this section first before you attempt to start the engine!

A nitro engine is a mechanical masterpiece and requires careful running in to allow the internal parts and tight tolerances to match and reach proper operating clearances. The proper running in of your engine determines its eventual performance and life. During this procedure, if you run the engine too lean and/or you let the engine make too much rpm, the result will be that you shorten the life and performance dramatically, and you can also permanently damage the engine. Running in the engine while installed in the car takes some time, but it also allows all of the components of the car to operate together with the engine for the first time under controlled conditions.

1) Once you have started the engine give the engine a few minutes to arrive at its operating temeprature, then let the engine run at a low RPM(idle) for at least 125cc of fuel, the idle must be regular, and if the RPM goes down and the engine stalls, then the engine probably too rich and we suggest you close the idle needle(1/4 turn at a time). If however the RPM goes up, the engine probably does not get enough fuel and we suggest you open the idle needle.

2) After the first run of 125cc of fuel, you refuel the car and open the main needle for at least ½ turn more than it was originally set. We now suggest you run the engine on the track so it will be cooled properly. During this process, be sure the engine does not make too much RPM (the engine must be making a sound like a four stroke engine and you must see excessive fuel coming out of the stinger of the pipe). If the engine makes too much RPM, close the throttle immediately and open the main needle one more turn, and repeat if necessary until the engine suffocates due to too much fuel, in this way you will be sure there is enough lubrication and the RPM does not go too high. Run the engine like this for at least 375cc of fuel, and avoid extended periods of full throttle running.

3) After this you can start closing the main needle so the engine makes more RPM but still makes a four-stroke sound and smokes a lot, this for at least another 375cc of fuel, and avoid extended periods of full throttle running.

4) After this you can close the main needle further until you reach about 80% of the engines performance (more RPM but still smoking), this for 250cc of fuel.

5) After this you can really start tuning the engine and go to 90% or 95% of its power but take care so that you do not overheat the engine causing it to loose power, if this happens stop immediately and open the main needle 1/4 of a turn.

✋Attention: During the running-in period the engine must always have a good and constant idle and have plenty of smoke and excessive fuel coming out of the stinger.

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How to start your engine

Note: The piston of the engine can feel tight at the top of its stroke(TDC) when the engine is cold, this is normal. The piston/sleeve is designed in a way that when the engine has reached its normal operating temperature this fit is perfect and so the engine produces the best power possible.

1) Fill up the fuel tank.

2) When starting the engine for the first time of the day, prime the engine by covering the exhaust pipe stinger while turning the flywheel with the help of the starter box for 2 seconds. This will build up extra pressure in the pipe and in the pressure line to the fuel tank, causing the fuel to be pushed into the carburetor.
While using the starter box you will notice an increase of rpm, this means the fuel has reached the inside of the engine and lubrification is making things easier.

3) Switch on the transmitter and receiver and set the throttle slightly open from the idle position.

4) Check if the starter wheel of the starter-box is turning in the right direction(the engine should turn counter-clockwise when the clutch is pointing towards you), then apply the glow driver on the glowplug and start the engine.
If the engine does not fire-up immediately, or does not make any sound that it wants to fire-up, then do not keep trying but stop for a few seconds keeping the glow-driver on the glowplug. After about 10 seconds, try again to start the engine. If the engine still does not fire-up, check if fuel is arriving in the engine and if not repeat the process from point 2.
However, if the engine is flooded (too much fuel inside), then remove the glowplug, open the throttle completely, cover the glowplug hole with a piece of cloth, and turn over the flywheel with the starter box(or pull starter). The excess fuel will be ejected through the glowplug hole.

Note: Before mounting the glowplug again, check the operation of the glowplug with the glowplug driver.

✋Attention: Hydraulic lockup is possible due to an excess quantity of fuel inside the engine and causes the cylinder to flood and to prevent the piston from moving upwards. If this happens, DO NOT keep trying to start the engine, or damage may occur. The excessive fuel also prevents the wire from glowing up correctly and so the engine will not start.

Tip: When the piston/sleeve is still new the fit can be very tight and so at first starting the engine can be quite difficult. To make this easier, you can pre-heat the engine with a hairdryer just before starting.

5) Once the engine has started, open the throttle a little to gradually let the engine to warm up to its operating temperature. This is an important routine that you should always follow, especially when the engine is still new. The internal parts need to receive lubrication and reach operating
temperature before pushing the engine to maximum performances.

If the engine fails to start.

- **Check if the glowplug is working.**
- **Check if the battery of the glow driver is properly charged.**
- **Check if the fuel is reaching the carburetor.**
- **Check that the engine is not flooded.**

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Carburetor settings

To be able to adjust the carburetor of a nitro engine correctly, you need patience and must try and understand how this works. Sometimes nitro engines are difficult to set, and if you have difficulties, then we suggest you ask your LHS(Local Hobby Shop) or Dealer where you have purchased the engine to help you in this matter.

If however you prefer to try yourself, here is how:

✋Attention: Work only on 1 carburetor adjustment at a time and make only small adjustments, maximum 1/8 of a turn!

Pre adjustments.
Once the engine is started let it reach operating temperature, then proceed as follows:

1) Set the main needle by holding the car off the ground, then open throttle completely. The engine should not completely clean out and should stabilize at 80% of top RPM, however if the engine cleans out completely and the rpm continues to climb too high, close the throttle immediately and open the main needle and repeat the sequence, until the engine does not clean out completely and the rpm stabilizes at 80%. If the engine runs too rich (4-stroking all the way), lean the main needle until the engine just starts to clean out.

2) Set the idle rpm of the engine by holding the car off the ground, then open the throttle until the engine reaches 80% of its rpm, then close the throttle. If the engine stalls, then the idle is too low and you need to increase the idle by turning the idle/air screw clockwise until the engine does not stall anymore. However, when the idle of the engine remains too high, then you need to lower the idle rpm by turning the idle air screw counter clockwise.

3) Set the idle needle by holding the car off the ground, open the throttle until the engine reaches 80% of its rpm, then close the throttle. If after 2-5 seconds the idle rpm decreases, the idle needle is set too rich, lean this needle by turning it clockwise. Repeat this process until the engine has a constant rpm for at least 20-30 seconds after the throttle has been closed. If the engine idles for 2-5 seconds and then the idle rpm increases, the setting is too lean, richen the idle needle by turning it counter clockwise to remedy this.

4) Set the idle rpm by using the idle air screw, and try to find a low but reliable idle rpm. A too high idle rpm makes it more difficult to slow the car during breaking.

✋Attention: When adjusting the idle needle, this then can effect the idle rpm, use the idle air screw to adjust the low rpm when it becomes too high or too low. Also when trying to set the carburetor for a too long period(approx 5 minutes) the engine will start to overheat and so the carburetor setting you are working on will not be valid anymore.

Once you are satisfied with your carburetor settings you are ready to put the car on the track and make the final adjustments.

Final adjustments while driving.
When ready with the pre adjustments you are now ready to put the car on the track and start your final adjustments. If you have set your idle needle and idle rpm correctly in the pre adjustment phase then you only need to adjust the main needle to find the correct setting and performances of your engine.
Start leaning the main needle by small increments(1/8 of a turn maximum) and run the car again, repeating this sequence until the engine completely cleans out, accelerates well and reaches maximum speed. To prevent your engine from running too hot, it is advised then to richen the main needle(1/8 of a turn counter-clockwise), since running the engine too lean on the main needle will cause the engine to overheat, resulting in excessive engine wear and possible breakage.

A possible way to check the engine temperature is to apply a few drops of water on the cylinder head. The drops should evaporate only after 3-5 seconds, If they evaporate immediately the engine is too hot, so richen the main needle (1/4 of a turn counter-clockwise) immediately. Check your engine temperature regularly.
Another way of knowing if your engine is running too lean, is when you are driving and the engine starts too loose its power at the low rpm range and no smoke is coming from the exhaust; if this happens, richen the main-needle if you do not want to damage the engine. Once properly adjusted, the engine should produce a strong, high-pitched sound at maximum speed, and a thin trail of smoke should be visible from the exhaust tailpipe.

NOTE: The carburetor settings may change with changes in weather conditions, fuel, glowplug or exhaust system. After changing any of these, always richen the main needle ¼ to ½ of a turn and then readjust the main needle again on the track.
NOTE: When the engine stops, the heat of the engine will go into the carburetor and alter the idle rpm. This can translate into a bad idle rpm, especially when you have your idle rpm a little low. This will come back to normal when you have made at least 1 lap on the track again so the carburetor has reached its normal working temperature.

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Maintenance

There are some important things you should know about nitro-engines... These high performance engines are not indestructible and can break if not enough attention is given to the proper setting and use. No warranty for these failures exists, and we cannot be held responsible for the use and treatment of any engine. As you must understand these engines can make up to 40.000 rpm, and so there are incredible loads generated by the moving parts of the engine. That is why it is extremely important that you check your engine on a regular basis to monitor the internal health of your engine like the play on the crankshaft pin/connecting rod fit, and if

compression is still sufficient. Most failures happen because of poor quality fuel, bad carburetor settings, bad air filter or excessive wear of the moving parts.

Attention: The nitro used in the fuel for these engines can react aggressively with the engine components, so to avoid internal corrosion we strongly suggest not leaving any fuel inside the engine after each day of use. To be sure, we suggest you start the engine, let the engine run, and then pinch the fuel line until the engine stops.

We suggest that you check the internal condition of your engine on regular basis, and if you are not familiar with this then we recommend that you ask your LHS or Dealer where you have purchased the engine to help you to check the overall condition of your engine.
If you run your engine very hard it is also advised that you replace the conrod after each 5 liters (1-1/2 gallons) of fuel run through the engine, because the conrod is the most stressed part inside the engine. Failure to do so may cause severe and irreversible damage to your engine. The changing of the conrod is best done by an expert or with expert guidance. Special attention should also be paid to the air filter. Make sure that it is always in place, well secured, in good condition.

Please note that it is very important that if you want to maintain or repair an engine yourself that you take care of the following;

- Always clean the outside of the engine thoroughly before you open it, work on a clean spot using appropriate tools, since any dust or dirt which comes into the engine will cause irreversible damage.
- All moving parts inside the engine are subject to wear, so you must know that if a piston and sleeve has worn, it is also probable the crankshaft pin and conrod are worn, so you must inspect and possibly replace these parts. If an engine has failed, you must check if all other moving parts are still in good shape, since if you only change the damaged part and other parts are not in good shape, it is highly likely there will be a new failure soon.

- Before you replace the conrod, be sure to measure the crankshaft pin and check if it is still round and at the right size(you can find this information on the technical sheet supplied with the engine), if not you must also replace the crankshaft. If the crankshaft pin is not to the correct size and you do not replace the crankshaft and reuse the engine, a malfunction will occur such as the failure of the conrod or piston breakage.
- If you want to replace the piston and sleeve, we suggest that you also replace the conrod and to be sure to check the crankshaft pin as mentioned above, and be sure the wristpin retaining clips are mounted in the piston correctly, otherwise they will jump out and damage the piston and sleeve.

These engines are of high technology and need to be treated with precision. If you are not sure how to maintain or repair your engine, you can ask your LHS or Dealer to do it for you.

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Warranty

Our warranty covers only workmanship and manufacturing defects of the original and unmodified engine and parts, and claims resulting from bad fuel, crashes, abuse, improper operation, improper mounting, improper adjustment, or lack of maintenance will not be honored.
No liability will be accepted for any damage or injury resulting from the use of this product. By the act of operating this product, the user accepts all resulting liability.

This warranty is extended solely by the manufacturer, TecnoPower Volta Mantovana ITALY, and all claims are therefore subject to expert examination and approval by TecnoPower, and are not the responsibility of the LHS or Dealer where you have purchased your engine, nor the TecnoPower distributor in your country.

CAUTIONS

- Dirt in the engine is by far the most common cause of major engine damage and voids your warranty. The air filter must be used all the time and be properly fixed to prevent dirt from coming into the engine. Also be sure to change your air-filter on regular bases depending in what circumstances you use your engine to prevent dirt from working its way into the engine.
- Be sure to purchase quality fuels, since the use of low grade, old, or improperly stored fuel can lead to decreased performance, shorten engine life and lead to possible engine failure.
- Poor maintenance will lead to decreased performance and short the engine life.

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DO!

- Always keep your engine clean, both internally and externally.
- Inspect your engine on a regular basis.
- Change your glowplug on a regular basis.
- Change your air filter on a regular basis.
- Completely remove the fuel when you are finished using the engine for the day.
- Always use an appropriate muffler.

DO NOT!

- DO NOT clean the engine with water.
- DO NOT use when the engine is not working right.
- DO NOT run the engine too hot.
- DO NOT run the engine without an air filter.
- DO NOT return an engine without prior approval.
- DO NOT use the engine on public streets or highways.

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Notes

TecnoPower constantly improves its products, therefor changes can be made without prior notice.
TecnoPower cannot be held responsible for any kind of damage or injury during building, storage, use or abuse of any of its products.
TecnoPower-Motor is a brand of TecnoPower Srl Volta Mantovana(MN) ITALY